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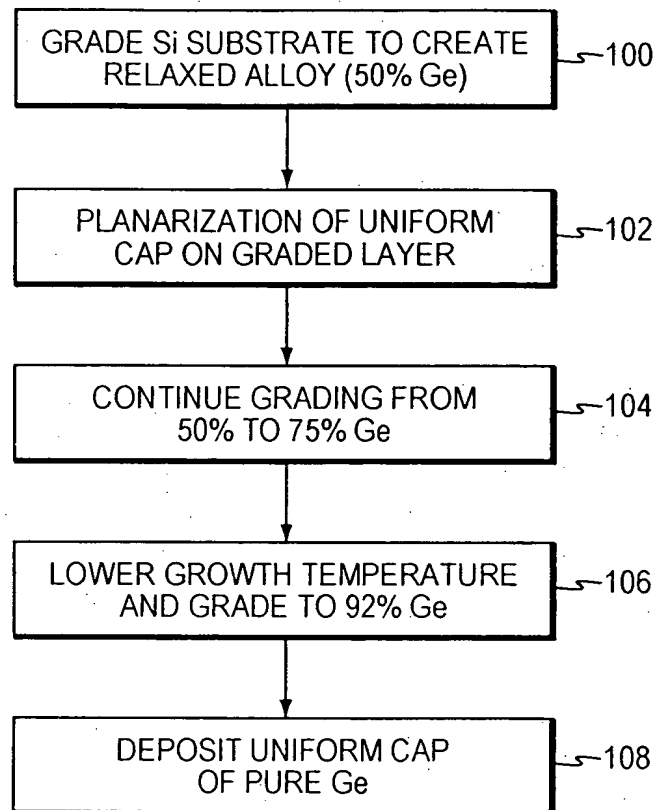


FIG. 1

| | SAMPLE A | SAMPLE B | SAMPLE C | SAMPLE D |
|--|-------------------------|-------------------|---------------------------|-------------------------------|
| FINAL Ge COMPOSITION | 100% | 100% | 50% | 100% |
| GRADING RATE (% Ge μm^{-1}) | 5 | 10 | 10 | 10 |
| TOTAL EPITAXIAL THICKNESS (μm) | 23 | 12 | 6.5 | 12 |
| GROWTH TEMPERATURE ($^{\circ}\text{C}$) | 750 | 800 | 750 | 50-76% : 750 76-100% : 550 |
| GROWTH PRESSURE (mT) | 25 | 50 | 25 | 50-76% : 25 76-100% : 3 |
| CMPAT 50% | NO | NO | - | YES |
| THREADING DISLOCATION DENSITY (cm^{-2}) | $1 \pm 0.1 \times 10^7$ | 1.5×10^7 | $6.3 \pm 0.1 \times 10^6$ | $2.1 \pm 0.2 \times 10^6$ |
| CRACK DENSITY (cm^{-1}) | 47 ± 5 | 0 | 0 | 0 |
| PARTICLE DENSITY (cm^{-2}) | 1250 ± 100 | 600 ± 40 | 50 ± 5 | 150 ± 10 |
| RMS ROUGHNESS (nm) | 35.9 | 47 | 37.3 | 24.2 |
| a \perp OF TOP LAYER (\AA) | 5.6559 | 5.6558 | 5.5327 | 5.6597 |
| a \parallel OF TOP LAYER (\AA) | 5.6559 | 5.6552 | 5.5352 | 5.6409 |

GROWTH PARAMETERS AND CHARACTERIZATION RESULTS
OF SAMPLES A-D

FIG. 2

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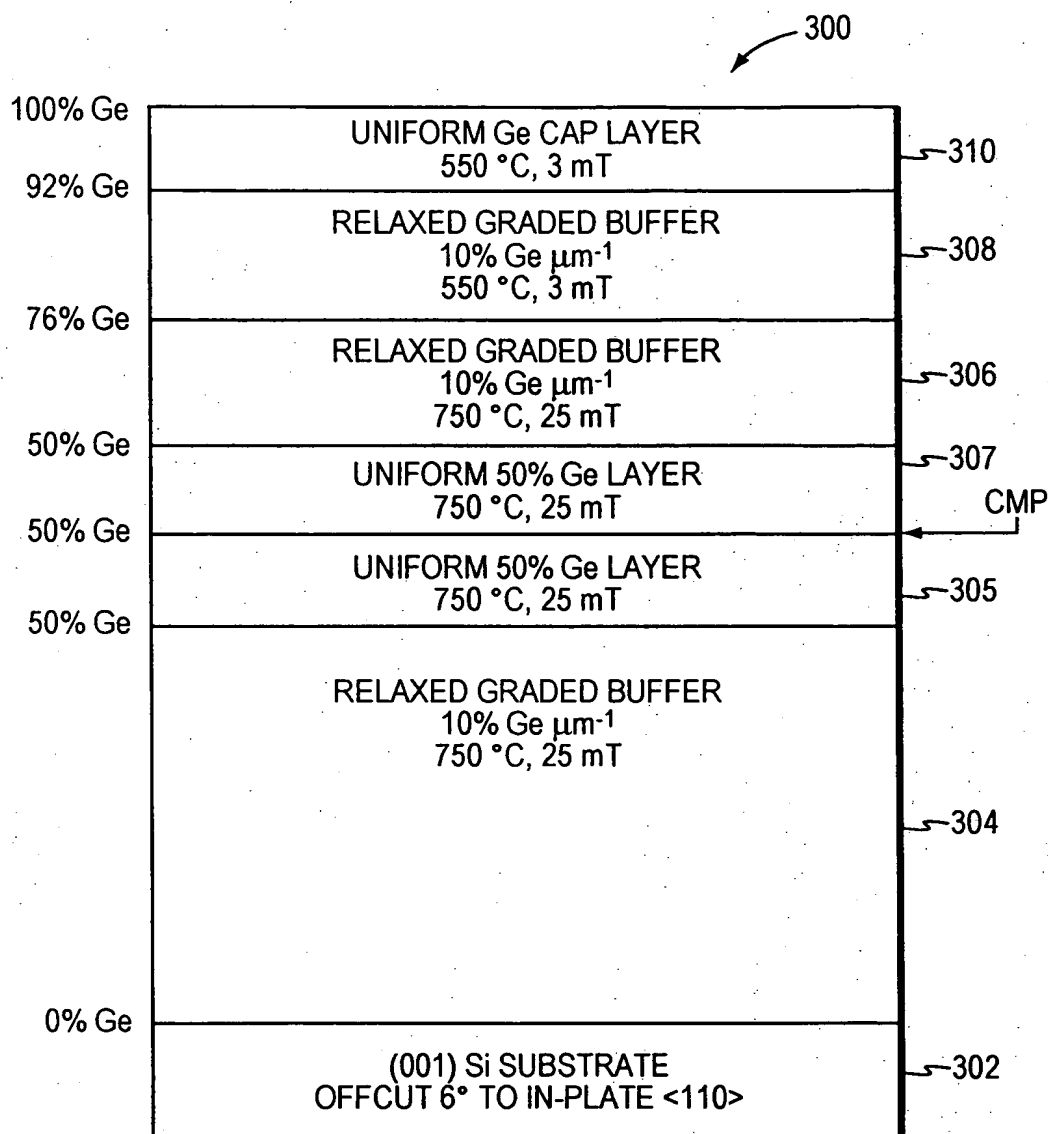


FIG. 3



FIG. 4

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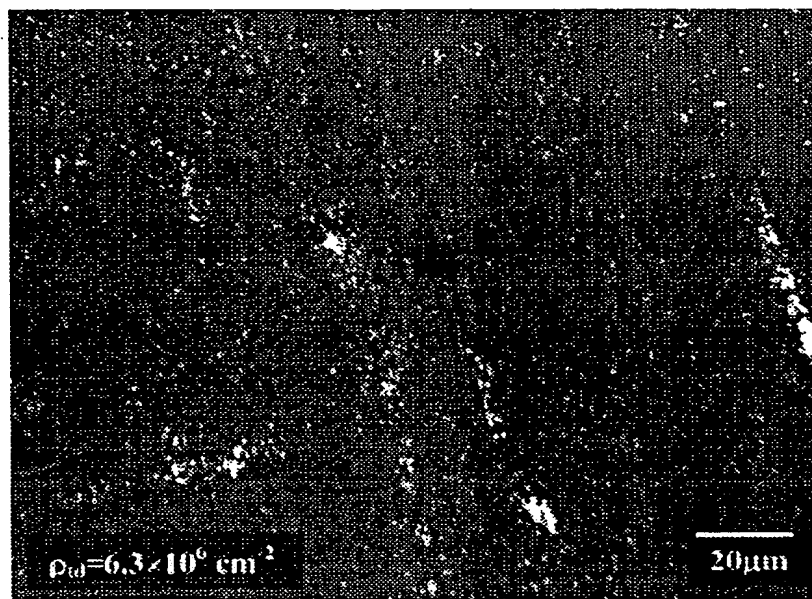


FIG. 5A

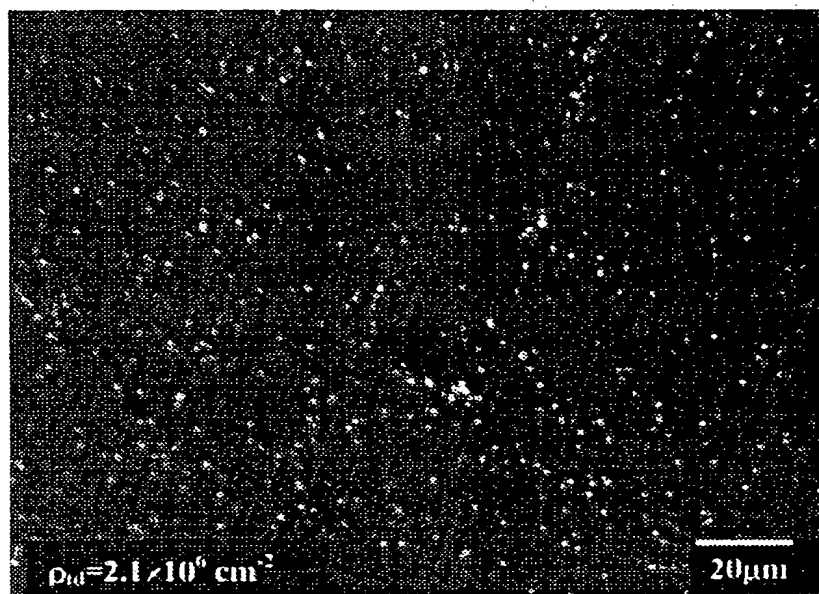


FIG. 5B